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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Surfactant-Containing Compositions

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(54) Title: SURFACTANT-CONTAINING COMPOSITIONS			
(57) Abstract <p>A liquid concentrate for dilution with water to give a liquid composition, which concentrate, on dilution with water gives an end composition having the same or an increased viscosity, and which contains, as thickening agent, (i) a surface active component consisting of an ether sulphate surfactant, alone or in admixture with another anionic surface active agent or a nonionic or amphoteric surface active alone, or a cationic surface active agent in admixture with a nonionic surface active agent; and (ii) an electrolyte and/or hydrotrope.</p>			

SURFACTANT-CONTAINING COMPOSITIONS

This invention is concerned with improvements in and relating to liquid compositions and, more especially, to concentrates for dilution, with water, to produce liquid surfactant-containing compositions.

The surfactant-containing compositions with which the invention is concerned are liquid compositions intended for application to a surface to bring a surfactant into contact with that surface, for example to cleanse it by deterative action and/or by germicidal or disinfectant action, or to condition it.

Thus, the present invention is concerned with compositions containing surface active agents as active ingredients and, also, with compositions containing other principal active ingredients, e.g. disinfectants or bleaching agents. The invention is thus, for example, concerned with cleansing compositions for application to hard surfaces such as sinks, washbasins, baths, toilet bowls, walls or floors. The invention is also concerned with compositions for application to soft surfaces such as fabrics, skin or hair, and may, thus, take the form of a shampoo, conditioner, hand soap or like product.

It is well known to provide so-called "thick" or "thickened" liquids compositions, that is compositions with generally increased viscosity, for application to hard surfaces. Such thick compositions have the advantage that, by virtue of their viscosity, they tend to remain in contact with vertical or inclined surfaces for a longer period of time than do more mobile compositions. Thickened compositions may also be poured in a controlled manner and are generally aesthetically appealing.

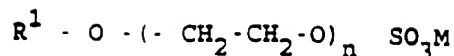
It is also known to provide precursors for liquid cleansing or like compositions (such as fabric softener compositions) in the form of liquid concentrates to be diluted with water, to the desired concentration, by the user. However, on dilution with water, thick concentrates become thinner, ie. reduce in viscosity.

It has now been found, in accordance with the present invention, that a liquid concentrate for a thickened composition may be formulated in such a manner that its viscosity remains the same or, preferably, increases on dilution with water, e.g. when diluted with water in a ratio of water to concentrate of at least 1:1, the product still has an acceptable viscosity, e.g. 50 cp or more at 25°C.

According to the invention therefore, there is provided a liquid concentrate for dilution with water to give a liquid composition, which concentrate, on dilution with water, contain the same viscosity, or increases in viscosity; the concentrate containing, as thickening component, (i) a surface active component consisting of an ether sulphate surface active agent alone or in admixture with another anionic surface active agent or a nonionic or amphoteric surface active agent, or a cationic surface active agent alone or in admixture with a nonionic surfactant; and (ii) an electrolyte and/or hydrotrope.

The concentrates of the invention by virtue of their relatively low initial viscosity, are readily miscible with water whereby to more easily obtain a uniform end product. The thickening of the diluted concentrate is effected by the presence of the specified surface active agents whose thickening effect, in the concentrate, is reduced by the presence of an excess of dissolved electrolyte. Thus, upon dilution of the concentrate, the concentration of dissolved electrolyte is, of course, reduced and the surface active agent component is then capable of exerting its thickening effect.

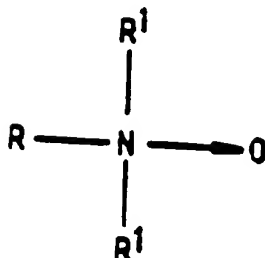
Suitable ether sulphates which may be used in accordance with the invention may be represented by the formula:



in which R^1 is an alkyl group containing from 8 to 20 carbon atoms, preferably from 10 to 14 carbon atoms; M is eg. an alkali metal, ammonium or alkylamine, cation, especially a sodium cation; and n is an integer from 1 to 6, preferably 2 to 4.

Other anionic surfactants which may be used in combination with the ether sulphates include alkylaryl sulphonates, alcohols sulphates, phosphate esters, sulphosuccinates, sulphosuccinamates, alkane sulphonates, olefin sulphonates, petroleum sulphonates, sarcosinates, taurates, isethionates, and soaps. Particular examples of these classes of anionic surfactants include those sold under the trade names Eltesol SX30 (sodium xylene sulphonate), Empicol L2 (sodium lauryl sulphate), Triton H55 (potassium phosphate ester), Marlinat DF8 (sodium sulphosuccinate), Hostapur SAS 30X (sodium alkane sulphonate), Hostapur OS (sodium olefine sulphonate), Petronate S (sodium petroleum sulphonate), Hamposyl L30 (sodium lauroyl sarcosinate), Fenopon T33 (sodium N-methyl-N-oleyl taurate), and Fenopon AC 78 (sodium coconut isethionate).

One particular class of non-ionic surfactants for use in combination with the ether sulphate surface active agents comprises the amine oxides of the formula:



in which R is a long chain alkyl group, typically containing 8 to 20 carbon atoms; and each of the groups R^1 is a lower alkyl group, typically containing 1-4 carbon atoms. Particular examples of this class of non-ionic surfactants are alkyl dimethyl amine oxides such as sold under the trade name "Empigen OB" by Albright & Wilson.

Other classes of nonionic surface active agents which may be employed comprise polyalkoxylated fatty alcohols and their esters; polyalkoxylated fatty acids; polyalkoxylated alkyl phenols; alkanolamides; polyalkoxylated alkanolamides, glucosides, polyglucosides, sucrose and sugar esters, fatty esters, ethoxylated alkanolamides, ethoxylated long chain amines; alkyl amines, alkyl polyglucosides and alkyl polyglycosides. Particular examples of these classes of non-ionic surfactants are those sold under the trade names Synperonic A (alcohol ethoxylates), Crodet L24 (polyoxyethylene-24-lauric acid), Synperonic NP (nonyl

phenyl ethoxylates), Empilan CME (coconut monoethanolamide), Triton CG110 (alkyl glucoside), Glucam E10 (10 mole ethoxylate of methyl glucoside), Crodesta SL 40 (sucrose cocoate), Empilan MAA (ethoxylated coconut monoethanolamide), Ethomeen C12 (ethoxylated coconut amine), and Tagosoft 16B (cetyl isooctanoate).

Suitable amphoteric surfactants for use in combination with the ether sulphate surfactants include alkyl betaines, alkyl aminopropionates, alkyl iminodipropionates; alkyl glycines; carboxyglycines; alkyl imidazolines sulphobetaines; alkyl polyaminocarboxylates and polyamphocarboxyglycines. Particular examples of such amphoteric surfactants are those sold under the trade names Tegobetain A4080 (alkyl dimethyl betaine), Ampholax XCU (coco-amphoglycolate), Amphotensid CT (alkyl imidazoline based amphoteric), Ampholax XCO 30 (coco-amphocarboxyglycinate) and Sandobet SC (cocoamide-sulphobetaine); and sodium N-coco-aminopropionate, disodium N-coco-iminodipropionate, and cocoglycinate.

Suitable cationic surfactants for use in the concentrates of the invention includes alkyl quaternary ammonium halides; primary, secondary and tertiary amines and their salts; and polyamines. Particular examples of such cationic surfactants are those sold under the trade

names Empigen BAC (alkyl dimethyl benzalkonium chloride), Armac 1 (tallow amine acetate-amine salts), Synprolam 35N3 (N-alkyl propane propane diamine), and Synprolam 35X10 (10 mole ethoxylated primary amine).

The nonionic surfactants for use in combination with the cationic surfactant may be a nonionic surfactant as described above for use in combination with the ether sulphates.

It is a matter for simple experiment to determine whether any particular surfactant or surfactant combination will or will not give the desired effect, i.e. thickening on dilution in the presence of electrolyte.

The concentration of the surfactant component in the concentrate depends upon two principal factors, (i) the concentration of surfactant component required to give a thickened end product of the desired viscosity and (ii) the degree of dilution contemplated. The former will depend upon the nature of the surfactant or the surfactant combination but is typically from 0.5 to 20% by weight, more especially 2 to 10% by weight, particularly 2 to 5% by weight. With regard to the dilution factor, a dilution of from 1 to 6 times, especially about 3 times, has been found useful.

Accordingly a typical concentration of surfactant in the concentrate is from 1 to 60% by weight, more especially 6 to 30% by weight.

The electrolyte used in the composition will typically be sodium chloride (which is in itself a component of one important cleansing agent, sodium hypochlorite bleach) but, of course, other water-soluble electrolytes may be employed, including builders such as sodium, sodium phosphates and alkali metal silicates. The amount of electrolyte required to give the desired effect is something which may be established by simple experimentation but, in general, it has been found that concentrations, in the concentrate, of about 10% by weight or more are useful, typically giving rise to final concentrations of about 3.5% by weight or more.

Where the principal surfactant component comprises a cationic surfactant which is a quarternary ammonium compound, this may conveniently be used in conjunction with a hydrotrope such as a lower alkyl (e.g. C_1 - C_3 alkyl) substituted aryl surfactant such as sodium cumene sulphonate or sodium xylene sulphonate. In this case no nonionic surfactant is required and the total level of quarternary ammonium surfactant in the amount is from 0.1 to 60% by weight; preferably from 0.1 to 10% by weight; that of benzene sulphonate being from 0.1 to 60% by weight, preferably 1 to 5% by weight.

By virtue of the provision of the thickening surfactant system, eventual diluted products obtained from the concentrates of the invention will often possess cleansing, detergent, softening or conditioning powers. However, the presence of other active materials in the compositions of the invention is entirely possible. One class of such other ingredients are bleaches, especially alkali metal hypochlorite bleaches. Thus, compositions in accordance with the invention may be formulated to give, upon dilution, an effective thickened bleach product and in this case the concentrate suitably contains the bleach in an amount sufficient to give from 0.1 to 10% by weight available chlorine. The bleach may also serve as an ancillary component, for example in a toilet or general purpose cleaner, and in this case suitably present in an amount to give from 0.1 to 10% by weight available chlorine. Other bleaches such as peroxide bleaches (e.g. hydrogen peroxide) and other halogen release bleaching agents may be employed in appropriate concentrations.

Other active ingredients which may be present include non-bleaching germicides or disinfectants and weak or strong acids which may serve as limescale removing agents e.g. glycollic acid, citric acid, hydrochloric acid and sulphuric acid. For hair or skin treatment, the composition may contain, as active ingredients, silicone surfactants, polymeric quaternary

compounds, and/or protein-based surfactants. Particular example of such ingredients are Abil B9405 (polysiloxane polydimethyl- dialkyl ammonium acetate copolymer) and Lameper 5 (potassium coco hydrolysed animal protein). Hard surface cleaning compositions may also contain solvents such as butyl dioxitol.

In addition to active ingredients, compositions in accordance with the invention may also contain colouring agents, such as dyestuffs, or fragrances.

In order that the invention may be well understood the following Examples are given by way of illustration only.

Examples 1-4

Bleach Formulations

	<u>Example</u>			
	1	2	3	4
Sodium hypochlorite	9.5%	9.5%	9.5%	9.5% AVCl_2
+ Empicol ESB3D	21.0	14.9	6.1	17.5
* Empigen OH25D	0.0	6.1	14.9	3.5
Soft water	to 100.0	to 100.0	to 100.0	to 100.0
Viscosity of concentrate, cps	40	65	200	88
Viscosity of diluted concentrate (1:3)	700	90	1500	305

- + = Sodium lauryl ether sulphate, 27% active
 * = Alkyl dimethyl amine oxide, 25%, active

Example 5Liquid Toilet Cleaner

g w/w

Soft water	to 100.00
Sodium chloride	13.00
Empicol ESB3D	28.00
Perfume	0.80

g w/w

Viscosity of concentrate, cps 40 cps

Viscosity of 1:4 diluted product 460 cps

Example 6Liquid toilet cleaner with bleach

g w/w

Soft water	to 100.00
sodium hypochlorite	4.9g AVCl ₂
Expicol ESB3D	35.00
Empigen OB	6.50
Perfume	0.50
Colour	qa

Viscosity of concentrate, cps 65 cps

Viscosity of 1:3 diluted product 490 cps

Examples

Compositions having the formulations given below had the viscosities noted

	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
Sodium lauryl ether	6.00	8.40	4.20	5.60	1.40	8.4
Sodium lauroyl sarcosinate	1.50					
Alkyl dimethyl amine oxide		1.25				
Sodium alkane sulphonate			1.50			
Alkyl amido betaine				1.50		
Sodium, lauryl sulphate					4.50	
Coconut diethanolamide						1.5
Electrolyte*	17.00	17.00	17.00	17.00	17.00	17.00
Water	to 100	to 100	to 100	to 100	to 100	to 100
Viscosity of concentrate	240	310	10	78	100	170
Viscosity of 1:3 dilution	795	2165	470	5000	470	400

Examples 13 and 14

Composition having the formulations given below had the viscosities noted

	<u>Examples</u>	
	13	14
Hexadecyl trimethyl ammonium choride	4.35	6.00
Tallow trimethyl ammonium chloride		1.50
Coconut diethanolamide	1.5	1.50
Electrolyte**	17.00	17.00
Water	to 100	to 100
Viscosity of concentrate	540	65
Viscosity of 1:2 dilution	2790	1005

** consists of a 2:1 mixture of sodium to magnesium sulphate.

Example 15

Fabric softener concentrate

	gww
1-methyl-2-alkyl-3-alkylamidoethyl- imidazolinium methosulphate	32.00
Tallow trimethyl ammonium chloride	11.80
Sodium chloride	8.00
Fragrance	2.85
Colour	qs

Viscosity of concentrate 80 cps
Viscosity of 1:5 dilution 410 cps

Example 16

Bactericidal Hand Soap Concentrate

	g/w
Sodium lauryl ether sulphate 2 mole	15.00
Alkyl amido betaine	5.90
Polysiloxane polydimethyl dialkyl ammonium acetate copolymer	0.30
Preservative	qs
Pearlising agent/opacifier	1.00
Fragrance	0.65
Triclosan	0.40
Sodium Chloride	11.60
Water	to 100.00
Viscosity of concentrate	340 cps
Viscosity of 1:2 dilution	560 cps

Examples 17

Tallow trimethyl ammonium chloride	9.0
Sodium cumene sulphonate	3.0
Water	to 100

Viscosity of concentrate	83 cps
Viscosity of 1:2 dilution	2025 cps

Example 18 - Disinfectant formulation

Tallow trimethyl ammonium chloride	7.30
Sodium xylene sulphonate	2.94
Benzalkonium chloride	2.00
Perfume	0.60
Colour	qs
Soft water	to 100

Viscosity of concentrate	45 cps
Viscosity of 1:2 dilution	675 cps

CLAIMS:

1. A liquid concentrate for dilution with water to give a liquid composition, which concentrate, on dilution with water gives an end composition having the same or an increased viscosity, and which contains, as thickening agent, (i) a surface active component consisting of an ether sulphate surface active agent, alone or in admixture with another anionic surface active agent or a nonionic or amphoteric surface active agent, or a cationic surface active agent alone or in admixture with a nonionic surface active agent; and (ii) an electrolyte and/or hydrotrope.
2. A concentrate as claimed in Claim 1 having a viscosity less than that of the diluted end product.